Recognition of our old friend, Oscar Burton, president of the Texas Telephone Association, by his fellow citizens in Tyler, Texas, was a bright spot in our thoughts the past few weeks. Oscar was selected as "Man-of-the-Week" by his townspeople and the press of that section devoted many columns to his accomplishments in behalf of Tyler, his home. This was about the only honor left as he has long been one of Tyler's leading citizens holding many civic positions.

▼

At times we are so busy in our own little niche that we are prone to miss the forest by seeing only the trees. Many of us are so accustomed to sing the "blues" over business conditions that we are just now awakening to the realization that the telephone industry is now in possibly its healthiest position of any time in its history. Plans for 1940 as announced by many of the larger operating companies are more widespread and liberal than in the past decade. With our state and National Associations functioning perfectly the future of Independent telephony is indeed bright.

▼

Our thanks to Russell E. Bilow, Flint, Mich., for his words of commendation to TELEPHONE ENGINEER, and his suggestions regarding safety. We are starting in this issue a series of Safety First cartoons — Do you like them?

TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

Vol. 44, No. 2 **February, 1940**

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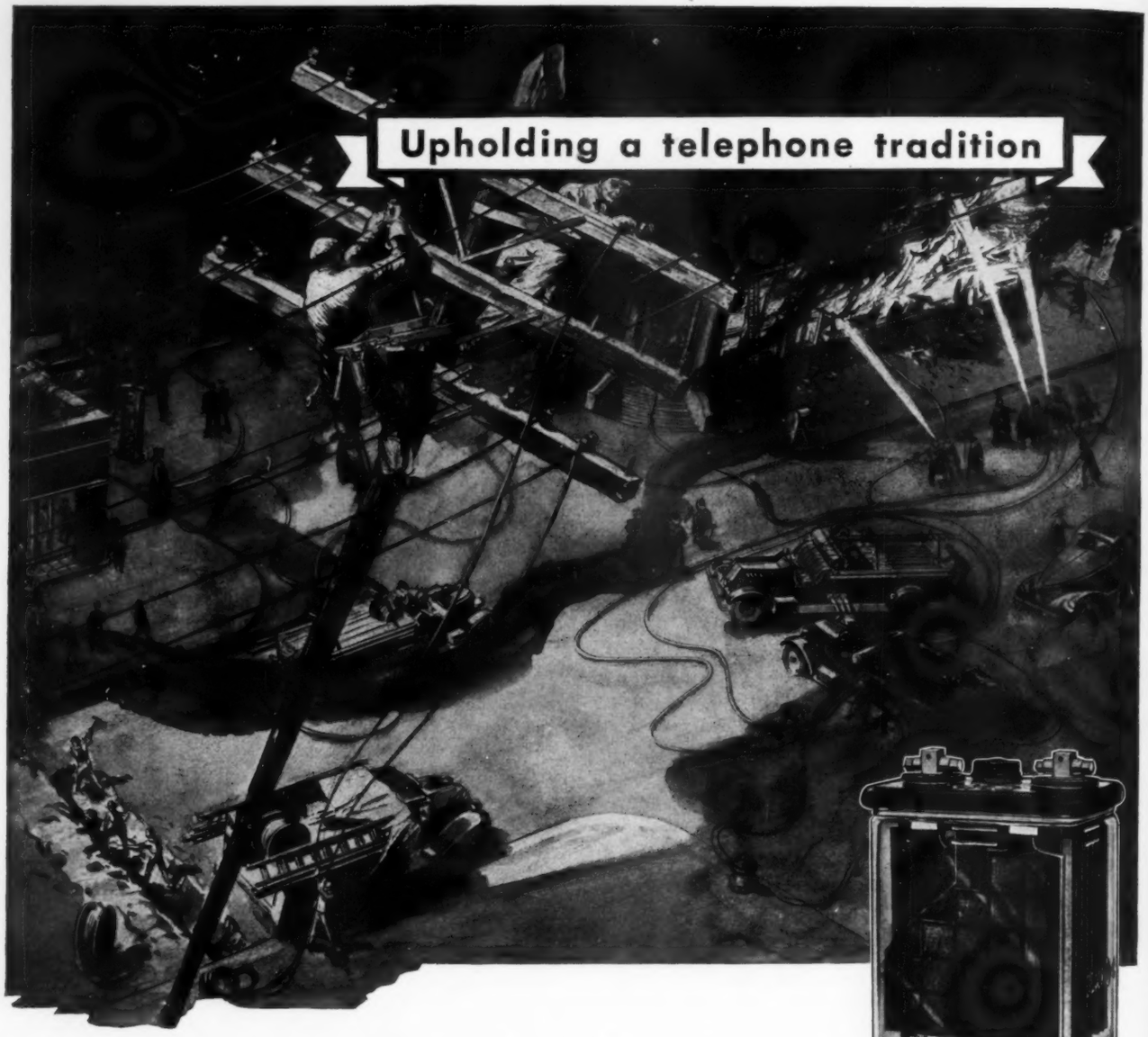

With telephone personnel and equipment, dependability always stands foremost

FIRE started in the basement of a main street grocery store. Quickly it gutted the building and raged through the walls next door. Before firemen could control it, the conflagration reached the telephone exchange. That building was doomed and had to be abandoned. But before the embers had stopped glowing, a temporary office was rented, the street was trenched, and cables were already being laid. The subscribers scarcely knew an interruption in the service had occurred!

Dependability is a telephone tradition, applying to personnel and equipment alike. Many acts of unusual courage, quick thinking, perseverance, mark the history of every telephone company . . . acts which are matched in a different way by the unfailing performance of telephone equipment, in routine as well as emergency.

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"Tapping In" On Washington

By ROLAND C. DAVIES
Editor
Telecommunications Reports

WASHINGTON affairs are becoming more and more tuned to the political situation and the fight for the Presidency in the coming party conventions and national election campaign. **This will mean, in all probability, that governmental activities and events in the National Capital in connection with the telephone industry should grow relatively quiet in their direct effect and impact.**

Congress appears interested only in legislative issues of political character or of popular appeal, such as the investigation of the National Labor Relations Board, and probably will complete little in the way of enacting legislation, except the usual appropriations bills and measures which have large public support, during the current session. However, one interesting trend in Congress is the growing viewpoint that the executive agencies and bureaus need to have their regulatory wings clipped and must follow more closely the Congressional intent laid down in their respective statutes. As an illustration was the approval by the House Rules Committee of the Walter-Logan bill to provide for greater latitude in court appeals from the regulatory agencies. The Rules Committee approval gives right of way for House consideration of this measure.

However, the New Deal Administration in certain lines of activities is laying a foundation for future governmental planning—in the hopes of continuance in power after next November's elections—that may produce some phases of importance interest for the telephone inlustry as prognosticating possible lines of additional governmental regulatory fields. As an outstanding example of this activity, the Temporary National Economic Committee, which has been termed the Anti-Monopoly Committe, is engaged in two lines of studies which may produce interesting developments for the telephone industry. One is the projected inquiry and hearings upon the technological effects on employment and at the hearings, slated for late March or early April, it is understood the technological developments in the telephone industry, particularly the automatic dial service, will be one of the subjects probed by the TNEC. The issue of competitive bidding for financial securities is another subject before the TNEC and the underwriting situation of Bell System bonds has formed a major phase of this investigatiton. Although the TNEC membership is said to be divided on the question of competitive bidding, a special staff of the Securities and Exchange Commission is now understod to be formulating a report on telephone financing and competitive securities' bidding which would be based on the facts of the recent TNEC hearings on that subject and the material gathered in the FCC Telephone Investigation. This report, if approved by the TNEC, would be transmitted to Congress as background for any future legislation on that method of security financing.

DURING the latter part of February, the FCC is commencing its first major telephone rate case, when hearings will be held on the Pacific Coast in connection with the interstate telephone toll rates of the Pacific Telephone and Telegraph Co. The first hearing is to be at Seattle, Feb. 26, when the FCC will inquire into the interstate rates affecting the State of Washington. Then the FCC will move its rate investigation to San Francisco, Feb. 29, and will take up the interstate rates of California, Oregon, Nevada and Western Idaho. The FCC is endeavoring to show that the Pacific Telephone & Telegraph interstate rates, because they are above the level of the American Telephone & Telegraph Long Lines rates, constitute a discrimination. However, the hearings which will be held by the FCC as a cooperative proceeding with the state commissions on the Pacific Coast may delve into broader phases, such as separation of interstate and intrastate plant and revenues, license contract payments and division of tolls. If the inquiry takes up the division of tolls, that phase should present important aspects for the Independent telephone industry.

After it concludes the Pacific Coast rate investigation, the FCC may embark upon another inquiry dealing with the A. T. & T. Long Lines rates. Commissioner Paul A. Walker launched the move for another reduction of A. T. & T. rates during the latter part of January when he proposed that on the basis of 1939 and present earnings a reduction of at least $10,000,000 could be instituted. The FCC approved his recommendation and voted to start studies on the possibility of such a reduction of rates, basing its action under the old order and docket of Sept. 9, 1936, under which the Jan. 15, 1937, $12,000,000 Long Lines rate reduction was negotiated by the Commission. (Detailed report of this rate reduction move appears later in this column.)

The most important event of the telephone industry in early February was the outstanding victory of the Wisconsin Telephone Co. in the U. S. Supreme

Court when the nation's highest tribunal refused to review the appeal of the Wisconsin commission from the decision of its state supreme court rejecting the highly controverted 1936 rate order reducing exchange rates by 8 per cent. This denial of the review of the Wisconsin rate case not only settled the lengthy controversy of that state commission's investigation of the telephone industry, but also cleared the Supreme Court's docket for the current term of all cases of direct bearing upon the telephone industry.

THE Supreme Court denied the Wisconsin commission petition for a review of the case with the statement that it was unable to find "that the decision of the highest court of the state did not rest upon an adequate non-Federal ground." In its rejection of the review, the Supreme Court disregarded the emphatic plea of the Federal government agencies, including the FCC, that the case should be considered upon the important question of determining depreciation deduction from the rate base. However, Chief Justice Hughes and the Supreme Court adhered to the policy of not reviewing cases from state courts involving utility regulation unless confiscation or violation of due process were issues. This policy was recently reiterated by the Supreme Court in its dismissal of the appeal of the Bell Telephone Co. of Pennsylvania from a commission rate reduction of its intrastate toll charges.

The rejection of the Wisconsin case appeal was felt to constitute an indirect slap at the FCC Telephone Investigation because the Wisconsin state courts in their decisions had castigated the state commission for its exparte procedure and misinterpretation of evidence in the rate proceedings against the Wisconsin Telephone Co. It will be recalled that the FCC Investigation was modeled largely along the lines of the Wisconsin rate inquiry and that two principal officials, the chief accountant and chief engineer, of the FCC Investigation were the leading witnesses of the Wisconsin commission in the rate case. The rate case testimony of these officials was severely censured in the opinions of the Wisconsin state courts.

Senate Telegraph Merger Hearings Likely To Be Put Off Until March

HEARINGS by the Senate Interstate Commerce Committee on the telegraph merger legislative proposal now are slated to be postponed until March. Previously it had been indicated the Senate Committee would start hearings in the latter part of February, but the pressure of other legislation, principally the railroad measures and a farm bill sponsored by Senator Wheeler, committee chairman, has necessitated the delay in the telegraph inquiry. At the same time, the Department of Justice revealed that it will continue to grant 90-day continuances of its anti-trust suits against Western Union and Postal Telegraph for their alleged exclusive contracts with railroads, hotels and clubs, until Congress acts upon the merger legislation. When favorable action by Congress occurs on the telegraph merger, the Justice Department indicated it would drop the suits and this position was interpreted as showing support of the telegraph consolidation by the executive end of the government.

FCC Commissioner Walker Feels Present Long Lines Earnings Justifies Rate Cut

In recommending the new investigation of A.T.&T. Long Lines rates with the objective of a rate reduction of at least $10,000,000 a year, FCC Commissioner Paul A. Walker based his proposal on the grounds that the present earnings and financial prospects of the telephone company were such as to indicate the Long Lines net income would be in excess of a fair return on the reasonable value of the interstate telephone plant. He felt the FCC could launch the investigation under the Sept., 1936, order of interstate rate inquiry because that was still open since the

(Please turn to page 22)

New Association Washington Representative

William Bruckart

William Bruckart, veteran writer on national affairs and lawyer, has become the new Washington Representative of the United States Independent Telephone Association, according to an announcement by Louis Pitcher, Executive Vice President of the Association. Mr. Bruckart has taken over the duties of the post in Washington, his offices being in the National Press Building.

Mr. Bruckart, who has the nickname of "Big Bill," is a long time resident of the National Capital but was born and raised on a farm in Western Missouri. He takes to his new post, besides his legal training, more than a quarter of a century of experience as a writer and commentator, coupled with some nine or ten years as an advisor to business. His writing at this time is confined to a weekly column of news comment which is syndicated to about 2,7000 weekly newspapers, thus reaching more communities than any other correspondent in Washington. Mr. Bruckart refuses to describe himself as a lawyer, but rather says he is a member of the District of Columbia Bar. He has never practiced law because his other fields of work appeal to him.

Through his years in Washington, Mr. Bruckart has built up an enviable list of contacts and has gained a wide knowledge of the machinery of Government. These facts, he said to TELEPHONE ENGINEER, he regards as the greatest assets in any trade association representative in Washington can have. Without them, any one attempting to render a service is lost in the National Capital, he observed, and added: "I do not intend to be lost."

Mr. Bruckart gained his law degree by attending night school, in Washington. He entered the news field as a reporter for the Wichita (Kansas) Eagle and served subsequently with the Kansas City Star, and the Associated Press in Washington. He spent some ten years as a financial and business writer with the Associated Press and as a syndicate writer before founding the Washington Digest, the caption of his weekly column that is now in its ninth year.

His training as a financial writer led Bruckart into the field of public relations and broadened his acquaintance with the problems of business.

Using pole derrick to lead heavy poles on a trailer.

Using the power take-up reel to recover messenger strand.

Using the winch and a dirt slip to backfill a conduit trench.

Modern Construction Methods

By
RAY BLAIN

"OLD Timers" of the telephone industry will have no difficulty remembering the days when a construction crew to be efficient must consist of at least ten or twelve men. Naturally, in those days everything was done the hard way and main strength and awkwardness was the rule. It was often jokingly remarked that the principal qualification of a good lineman was to be blessed with a strong back and a weak mind. While these men were often artists in the juggling of long pikes and a jenny in setting high poles, they could not even by practicing extreme care remove the danger from this type of work. I shall never forget the time I witnessed the killing of a man by a falling pole while it was being piked into a hole.

This has all since changed and now the modern construction truck, equipped with a good winch and a pole derrick removes much of the danger and drudgery from modern telephone construction work. A crew of four or five men with a properly equipped truck can probably do twice the amount of work as was formerly possible with the larger crew. Considerably less time is also lost now in traveling to and from work than in the old horse and buggy days with the bad roads of that period.

Naturally the derrick and power winch provide an ideal means of setting poles in any kind of a line. The ordinary pole derrick will easily erect a forty or a forty-five foot pole and we have on occasion used ours to set sixty foot poles. However, to set a pole over fifty feet, the hitch where the winch line attaches to the pole must be made rather low and then pulled up close to the derrick head with the butt of the pole placed directly over the hole into which it is to be set. While the pole is held in this position the truck should be slowly backed which will cause the pole to be lowered into the hole. If the hitch on the pole is placed at exactly the correct point, poles may be set in this manner without difficulty or danger.

Occasionally it is necessary to set poles of a height greater than sixty feet and in this event the use of a gin pole is ordinarily recommended. The pole derrick may be used to erect a gin pole about forty feet in length which should be well guyed in place. This gin pole may ordinarily be set on top of the ground or in a hole about six inches deep located as near as possible to the hole into which the long pole is to be set. This shallow hole will be of considerable assistance in the erection of the gin pole and reduces the possibility of the butt sliding along the ground before the full weight of the high pole is placed on it. The winch line used for raising the high pole should be run through two snatch blocks or a two-sheave block and tackle on the gin pole. When two snatch blocks are used, one should be placed at the top of the gin pole and the other attached near the ground level at the butt with suitable sling.

THE pole derrick may be used to advantage in the pulling of old poles which must be removed from the line for replacement. While the strength of present day pole derricks have been increased to such an exetent in recent years that there is not much danger of them being damaged by pole pulling, it is always a good plan to use a rope on the pole hitch which will break before damage can be caused to the equipment. When pulling a pole the center leg of the derrick should be placed on the ground near the pole. An iron base plate is ordinarily furnished with the derrick and should be used to prevent the tubular center leg from sinking into the ground when the weight of the pull is placed on it. When a large number of rather small poles are to be pulled as when salvaging a rural line it is often possible to place the winch line over the rear crossbar and sheave of the truck when this equipment is mounted in the top position. This method is quite effective and is much quicker than setting up the pole derrick at each pole to be pulled.

The derrick and winch may also be used to advantage in handling numerous heavy objects with absolute safety. Heavy poles may be unloaded from a car or onto a truck or trailer with both speed and safety. Small cable

Erecting a gin pole to use in raising a high pole.

Erecting a 60-foot pole with an ordinary pole derrick.

splicing trailers may also be lifted safely for loading onto another vehicle. Full cable reels when too heavy for lifting by the derrick may be rolled up or eased down skids by means of the winch line. The cross-bar and sheave when placed in the top position may also be used in lieu of the derrick for lifting heavy objects for loading. When an unusually heavy load is lifted on a pole derrick supporting jacks should be used to protect the springs of the truck. These jacks may now be obtained attached direct to the truck body and are convenient to use.

Perhaps the most important use for a power winch on a modern telephone system is the pulling-in, both aerial or underground cable. The winch line should be of adequate length to pull-in the longest section of underground cable in the plant. The winch not only has adequate power for this type of work, but may also be run slow and steady which is especially desirable on work of this nature. When makeshift methods are used for cable pulling, such as hitching it onto a truck and driving off, it is generally pulled too fast and if the pull must be stopped, starting again generally causes a jerk. This may injure the cable or cause the lead to slip which may result in losing the cable due to the grip releasing from the end. When cable is pulled-in too fast, there is a danger of injury as it leaves the reel and enters the duct. A cable guide should always be used and with all other conditions normal cable may be pulled into a main duct line at the rate of about ninety feet per minute. Ordinarily a full section may be pulled in at this rate of speed without stopping unless trouble is encountered if the reel is properly aligned and level. Also, this rate of pull is slow enough to permit the cable to be watched as it leaves the reel in order that all sheath cracks or breaks may be caught and repaired before placing in the ducts. A good cable lubricant should ordinarily be used except on very short lengths.

WHEN pulling-in irons have been installed in manholes, a snatch-block and a manhole sheave, which lays on the manhole cover rim, make an ideal cable pulling arrangement. When pulling-irons have not been provided, a manhole skid which consists of two large pulleys which may be adjusted in position on two strong timbers may be used. This skid arrangement while not as convenient as the pulling-in irons may, if properly used, prove entirely satisfactory.

When pulling-in aerial cable an iron wire can ordinarily be placed in the cable rings when they are installed on the messenger and used in lieu of the winch line for pulling-in the cable. This wire may be coiled up on a power take-up reel which saves considerable time over the method of using the winch line for this purpose. This wire must be placed in the rings anyway and using it direct when possible saves the time required to pull in the winch line in preparation to pulling-in the cable.

The power winch may also be used to advantage for pipe pushing by utilizing some special equipment which may be fabricated locally at a small cost. To acoomplish this, a short length of trench is dug in which to place the first section of pipe being pushed underground. A short cross-trench is then dug in which a timber with two pulleys or snatch blocks have been attached. A reducing coupling with a plug is then placed on the end of the pipe being pushed and a short length of pipe one or two feet long with a coupling is placed on the other end. The winch line is then threaded through one of the pulleys on the cross-timber, a snatch block on the rear end of the pipe, back through the second pulley on the cross-timber and attached to the end of the pipe with a suitable hook. Then when a pull is taken on the winch, the pipe will be pushed into the ground. When the short length of pipe has reached a point near the cross-timber, it should be removed and a new section of pipe screwed into the length already pushed underground. The short section of pipe should be again installed as it is necessary to protect the threads on the end

(Please turn to page 29)

Pulling-in cable with a manhole sheave.

Pulling poles with the winch pole and derrick.

The Cablemen's Fault Location Bridge

By L. E. CLAYPOOLE, A.I.E.E.
The Peoples Telephone Corporation
Butler, Pennsylvania

(CONCLUSION)

Taking a measurement with Cablemen's Bridge on the open-wire of an unattended dial exchange.

For instance, if the bridge reads 900 ohms, and the size of wire being measured is 24 gauge, following straigh across the chart from 900 on the 0 to 1000 ohm Resistance scale until the line representing 24 gauge wire is encountered, and thence straight downward from this intersection to the corresponding distance scale, the distance of the fault from the strapped end is 17,550 feet (approximately); or, if the bridge reading is 90 ohms, then the distance to the fault is 1,755 feet, (obtained by reading scales as one-tenth their given values). Similarly, if the bridge reading is 19.5 ohms on 19 gauge wire, by locating 19.5 ohms on the 0 to 500 ohm Resistance scale and following horizontally from this point to the point where the 19 gauge line is intersected, thence upward to the corresponding Distance scale, a value of 1210 feet is indicated as the distance to the fault.

In some instances it may be found that the bridge reading resulting from a measurement upon a given size of wire is too great to permit reading the distance to the fault from the chart directly—for example, 50 ohms on No. 10 copper wire. The location may readily be established by starting from 5 (one-tenth the bridge reading) on the 0 to 500 ohm resistance scale, following across to the point where the line representing No. 10 wire is intersected, and thence upward to the associated distance scale. The indicated distance found thereon is then read as ten times its stated value (2500), or 25,000 feet, approximately.

It will be seen from the foregoing explanation that by using the lowest scale range upon which the bridge reading may be applied, the greatest accuracy in reading the distance to the fault from the chart is obtained. It follows, therefore, that if the bridge reading lies between

500 and 1000 ohms—the 0 to 100 ohm scale should be used

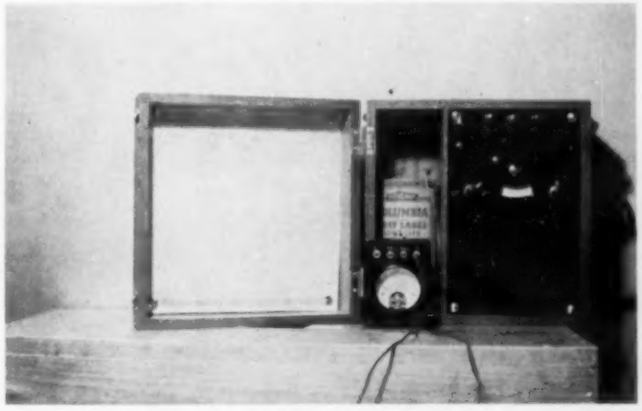
100 and 500 ohms—the 0 to 500 ohm scale should be used

50 and 100 ohms—the 0 to 1000 ohm scale should be used by reading both resistance and distance scales as one-tenth their stated values.

0 and 50 ohms—the 0 to 500 ohm scale should be used by reading both resistance and distance scales as one-tenth their stated values.

THE resistance scales of this chart are based on a temperature of 68 degrees Fahrenheit. It must be remembered that the resistance of nearly all conductors has a tendency to increase with temperature. Therefore, if the temperature is substantially above or below 68 degrees Fahrenheit, the location of the fault should be expected to be found at a lesser or greater distance, respectively, than that indicated by the chart. For example, if measurements are being made on 24 gauge cable at a temperature of 32 degrees Fahrenheit, the resistance will be lower for this size wire by approximately .056 ohms per degree of difference between 68 degrees and 32 degrees for each thousand feet of wire. Therefore, to each thousand feet indicated by the chart as being the distance to the fault, approximately 80 feet should be added to compensate for temperature variation.

Another situation that frequently arises in locating faults by bridge methods involves branched circuits. If the circuit is strapped at the end of the main cable, and if the fault lies in one of its branches, then the apparent location from the bridge reading will be at the point of junction of the branch and main cables. By removing the strap from the end of the main cable and strapping the end of the circuit in the



Ohmmeter and Cablemen's Bridge with resistance-distance to fault curves shown as mounted inside of Bridge cover.

The Cablemen's Bridge and Ohmmeter in use at the main frame of an unattended dial exchange.

branch, the fault may be located in terms of distance along this path.

When the distance to the fault has been determined, an inspection of the cable for a distance of one and not more than two sections each way from the point located should be made. If no trouble is observed, then the nearest splice should be opened and another test made.

Errors attendant with bridging for the location of faults may arise from various sources. It is always well to know where these might occur and to endeavor to hold them to minimum values. One of the most frequent causes for inaccuracy in locating faults is that of poor connections in the loop circuit. Since any resistance caused by a poor connection enters directly as an error in the location, the importance of good connections cannot be too greatly stressed. Always be sure that the surface of conductors to be connected are clean and polished, and make the joints tight.

DISAPPEARING grounds are occasionally encountered. If, after waiting for a short period of time, the ground does not reappear, it may be possible to catch the location by increasing the battery voltage and taking a quick reading. Another expedient is to apply ringing power to the faulty line which may either reduce the resistance to ground or permanently burn it out. The bridge should be disconnected from the line before ringing over it, otherwise the meter might be injured.

Inequalities of line resistance very often become a dominant factor in inaccurate measurements. These are due principally to slight variations in gauge, bad joints, and unequal temperature conditions on different parts of the line. In general, it is not possible to apply corrective measures to these instances. Fortunately, it will be found that in most cases causes for inequalities in resistance do not have cumulative effects, and the tendency will be for the effects of one to be canceled by that of another.

When two or more faults exist, or one of considerable extent, such as caused by the presence of moisture over a section of 25 to 50 feet, it will generally be found impossible to balance the bridge. If a balance is obtained it is unlikely that an accurate determination of the probable location will be indicated. Usually the calculation will fall between the two faults and nearer the one of lowest resistance. However, since there is no way of determining the resistance to the faults the probable location cannot even be estimated.

(END)

Obituary

James A. Luhring, 60, vice president and general manager of the Princeton, (Ind.) Telephone Co., died January 31, at his home in Princeton after an illness of 2 months. Beginning his career in the telephone industry in 1897, Mr. Luhring spent his entire business life in Indiana with the last 33 years in Princeton. He started as a groundman and served in almost every capacity in telephone work during his lifetime. He was a member of the Telephone Pioneers of America.

L. Scott Powell, 38, general traffic manager of the Southwestern Bell Tel. Co., St. Louis, died suddenly January 23, following a game of squash racquets. Falling in exhaustion, he failed to revive. He started his telephone career in Ft. Worth, Texas, in 1920, and was made general traffic manager in 1938.

Charles L. Goodrum, 65, founder of the old American Automatic Telephone Co., at Urbana, Ohio, and inventor of many devices of use in automatic telephony died of heart attack in his home in New York City, January 30.

Correction

We offer a correction to the text of the Claypoole article which started in our January issue.

On page 29, column 3, January, 1940, issue, Mr. Claypoole asks us to change the first paragraph to read: "The resistance arm R is composed of four variable resistances of the decade type, which afford a capacity for resistance measurements of 1,111.0 ohms in steps of 0.1 ohm."

Pennsylvania Selects G. S. Herbert As Association Head

G. S. Herbert

At the regular meeting of the Pennsylvania Independent Telephone Association held during January at Harrisburg, G. S. Herbert, president of the United Telephone Co. of Pennsylvania, was selected as president of the Association for 1940. He succeeds John H. Wright, retiring president.

Harry M. Engh, president of the Pennsylvania Telephone Corporation, and Joseph F. Stockwell, executive vice president of the Keystone Telephone Co. of Philadelphia were chosen as vice presidents. Other elected were: treasurer, George B. Rudy, Jr., president of the York Tel. & Tel. Co.; executive secretary, H. M. Stewart, Harrisburg, and Miss M. E. Cunningham, secretary

Mr. Herbert is a veteran of 39 years in telephone work which started at Harrisburg in 1901 with the Dauphin County Telephone Company. He brings to the Pennsylvania Association an experience gained by a practical experience of operating company problems.

Short Course in Telephone Transmission

By
B. C. BURDEN

TELEPHONE REPEATERS—Cont'd from January Issue

The actual terminal ringer circuit is slightly more complicated than indicated, as several slow relays are used to insure that the ringing signal is not applied until after the "cut off" relay is operated.

135 Cycle Intermediate Ringers

135 cycle ringing current must be bypassed around through line repeaters for the same reason as 20 cycle current. The circuit used is practically the same as for a 20 cycle intermediate ringer arrangement, except that the receiving relays are tuned for 135 cycle rather than 20 cycle current.

Some intermediate ringers are arranged to operate on 135 cycles in one direction and 20 cycles in the other. This arrangement is required where two sections of toll line may be connected together and where one section may be equipped for 135 cycle signalling and the other 20 cycle.

1000 Cycle Ringing System

THE most versatile of the several signalling arrangements is the 1000 cycle system (also called voice frequency system). 1000 cycle signalling is employed with the longer toll lines and in connection with carrier circuits. This system uses a 1000 cycle signalling current which can pass thru intermediate repeaters without the necessity of any auxiliary ringing apparatus. The general arrangement for voice frequency signalling is the same as for the 135 cycle terminal ringer with the exception that the receiving relays are tuned to 1000 cycles instead of 135 cycle, and 1000 cycle current instead of 135 cycle is sent out on the line .

A block diagram of a 1000 cycle system is shown in Fig. 5 This functions in the manner previously described for the 20 and 135 cycle terminal ringers, however, a more complicated relay arrangement is required.

We have stated that a 1000 cycle current is sent out on the line but actually the current used is 1000 cycles but interrupted at a 20 cycle rate. The ringing source is arranged so as to provide this modulated 1000 cycle current.

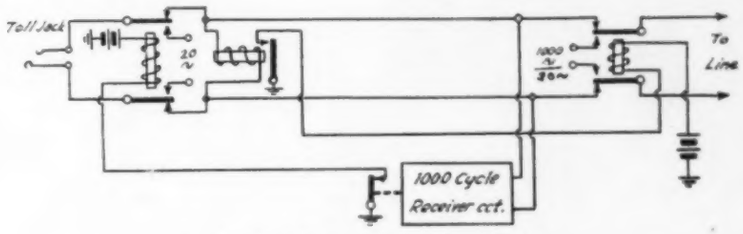


Fig. 5—Block Diagram of 1000 cycle system.

The circuit of the 1000 cycle terminal ringer is shown in detail in Fig. 6.

On receiving this circuit functions to receive the 1000 cycle signal, to rectify it, to convert it into 20 cycle current which operates a tuned relay which in turn causes other relays to operate and these relays connect the regular 20 cycle source to the drop.

Let us study this circuit in detail. First let us see what happens on outgoing signals.

The operator inserts a cord into the line drop and rings, using of course the regular 20 cycle ringing source of the cord circuit. This ringing current passes into the 20 cycle A. C. relay **A** causing its armature to pull up, which sends battery thru relay **B** and this relay operates cutting off the circuit back to the drop and connecting the 1000 cycle source which is interrupted at a 20 cycle rate to the line.

ON incoming signals the 1000 cycle signal is impressed thru transformer **T1** on the grid of a three element vacuum tube. The tube is biased so that it functions as a rectifier, hence the 1000 cycle impulses are rectified as shown in Fig. 7.

These rectified 1000 cycle pulses are impressed on transformer **T 2** and due to the action of the transformer are converted into 20 cycle current. This current actuates Relay **C** which is polarized and tuned so that its armature actually vibrates at a 20 cycle rate. This armature alternately charges and discharges condenser **C1** causing it in effect to create a 20 cycle current flow through relay **D**. The operation of relay **D** sends battery current thru relays

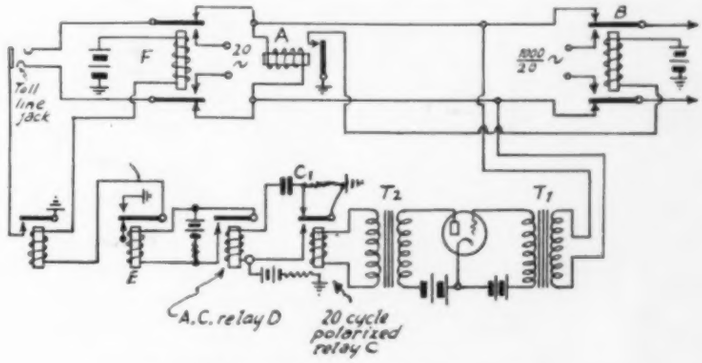


Fig. 6—Schematic circuit of 1000 cycle system.

A new slant on Te

Telephone Design

A careful examination of the new Type 40 self-contained desk Monophone will reveal that in many important respects it represents a refreshing departure from conventional telephone design. For in creating this truly modern instrument, its designers approached the problem primarily from the standpoint of the person who actually uses the instrument — the telephone subscriber, whose satisfaction and goodwill is so vital to profitable operation.

As a consequence, you will find in the Type 40 Monophone many things which you have always wanted to find in a telephone, but have been unable to heretofore. Smooth, flowing beauty which results from basic structural simplicity. A perfectly balanced handset that will surprise you with its lightness, and which is curved to fit both hand and ear with real comfort. An amazing clarity and fidelity of voice transmission, even under difficult operating conditions.

To carry this Monophone, you have a choice of two handy lifting arrangements; separate cord holes prevent unsightly twisting; a new two-tone ringer provides a pleasingly mellow signal with great penetrating power. Telephone executives who are interested in the latest and finest in substation equipment, will wish to try out this Monophone for themselves. Order a sample —today!

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Additional pole lengths may be added by means of the splice shown at lower left.

Poles are solid spruce treated with three coats of pole preservative and voltage tested. Rope is ¼" treated spot cord. Pull rod on lever type is laminated plastic. Galvanized promal fittings combine light weight with strength. Write for more complete details and prices.

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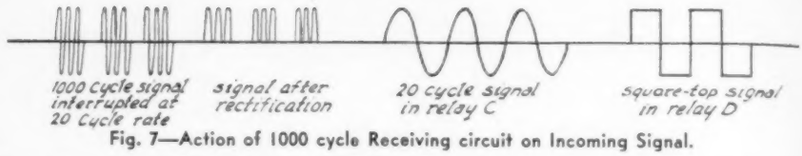

1000 cycle signal interrupted at 20 cycle rate
signal after rectification
20 cycle signal in relay C
square-top signal in relay D

Fig. 7—Action of 1000 cycle Receiving circuit on Incoming Signal.

E and **F** which action places a ground on the sleeve of the called line jack and also connects 20 cycle current to ring down the drop.

At first thought it would seems that this 1000 cycle receiving circuit has been unnecessarily complicated and the same results could be obtained by using fewer relays. However all relays are needed as it is only by resorting to the several tuned circuits that false operation of the ringing system can be avoided.

Inasmuch as 1000 cycles is approximately the middle of the voice range transmitted by a telephone system, it is obvious that unless the several tuned circuit are used that a sustained 1000 cycle tone in the speaker's voice might cause false operation of the system.

"Tapping In" on Washington

(Continued from page 14)

Jan., 1937, $12,000,000 cut was done by negotiations with the company.

It was believed that the FCC was hopeful that its proposal for another rate reduction would precipitate negotiations with the company to achieve that objective. How, if no negotiations materialize, the FCC may attempt to stage a formal rate proceeding though it has a limited staff for such an undertaking. It was felt that the move for another rate slash was pointed to bring to the attention of Congress the need of the FCC which it has repeatedly made to Congressional appropriations committees for additional funds to expand its telephone regulatory activities. The rate reduction plan, too, might have been pointed towards arousing the interest of Congress in the FCC Telephone Investigation Report now before the Senate and House Interstate Commerce Committees which seems doomed to be shelved entirely at this session.

The FCC proposal for another substantial slash of long distance rates is highly important both for the Bell System and the Independent telephone industry as it will mean a decrease in toll revenues. The idea that because of improved net earnings a decrease in rates should be instituted seems to be countered with other contentions such as the fact of the increased construction program of the A.T.&T. and Bell System which needs funds from the revenues and which means added employment by the industry and that, while business conditions now are improved, the question arises as to the policy of the FCC if in the future because of depressed business would an increase in rates be permitted. Then, too, the plan of another long distance reduction of rates is contrary to the FCC s policy to help the telegraph companies out of their present situation when it will be recalled the Commission telegraph merger report stressed long distance telephony was a most potent competitor of the telegraph companies.

FCC Postpones Until 1941 Date for Completing Continuing Telephone Property Records

BECAUSE more time for further conferences and studies is required to complete the final accounting formulae for the continuing property record, the FCC has extended from June 30, 1940, to June 30, 1941, the date for completion of records requiring Class A and B telephone companies to prepare the continuing or perpetual detailed record of telephone plant under the Uniform System of Accounts. This will mean the postponement until next year of the effectiveness of the continuing property record reports in the uniform system and the annual reports of the telephone carriers.

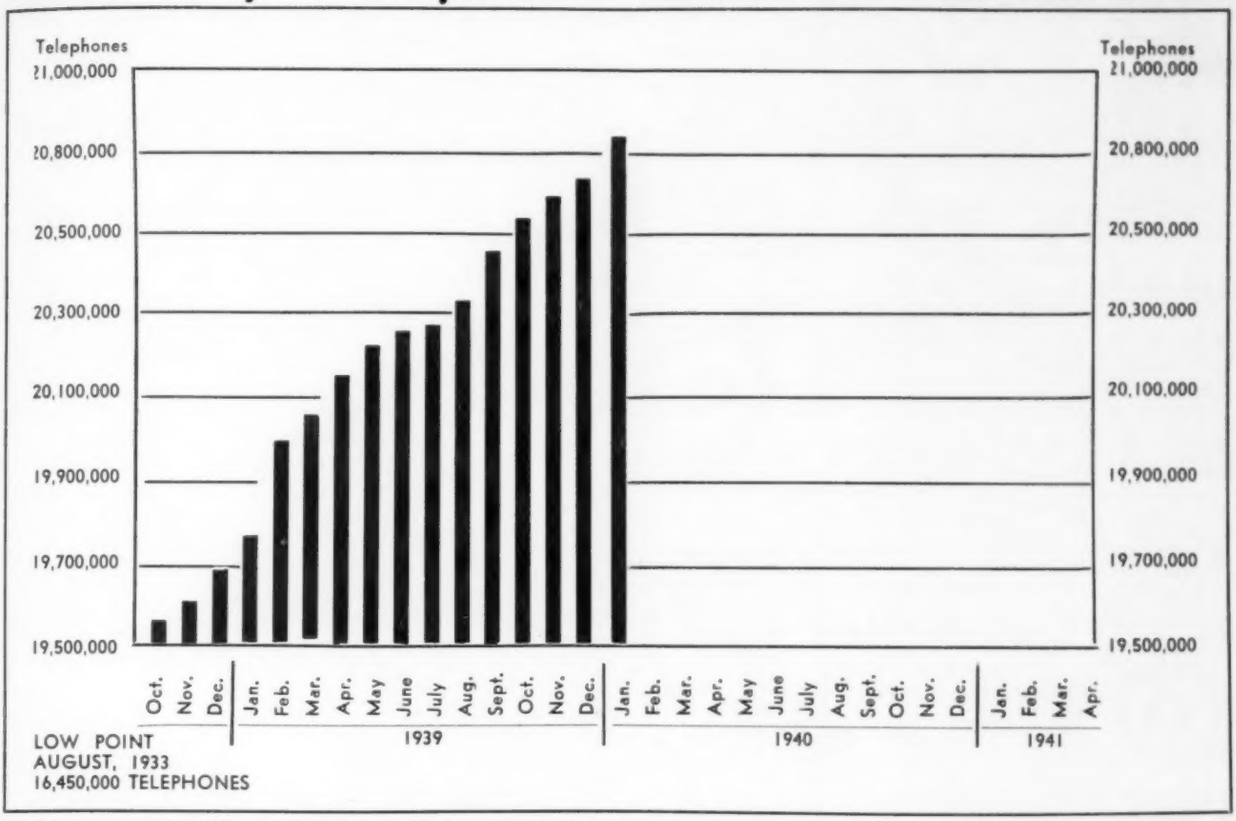
Further conferences between the telephone industry and the FCC and state commissions are to be held, it is believed, to iron out certain problems and it is possible that the smaller telephone companies subject to the accounting system may be afforded relief through less detailed reports. It was felt that substantial progress was made at the recent sessions of the FCC, the Accounting Committee of the National Association of Railroad and Utilities Commissioners and the accounting representatives of the Bell System and United States Independent Telephone Association.

FCC Appropriation Slashed by $40,000 by Senate

The FCC will probably end up its annual tussle with Congress for ap-

(Please turn to page 31)

Monthly Telephone Station Barometer



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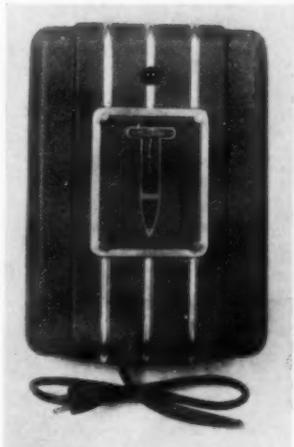

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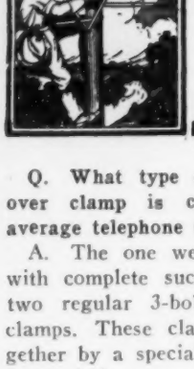
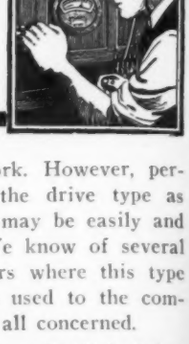


LINE and DESK

RAY BLAIN, Editor



Q. What type of messenger cross-over clamp is considered best for average telephone use?

A. The one we have always used with complete success is made-up of two regular 3-bolt cable suspension clamps. These clamps are joined together by a special bolt placed in the center hole.

Q. In the operation of teletypewriter service is a metallic circuit required or may a grounded circuit be used to connect two separate machines?

A. The grounded circuit may ordinarily be used if the two machines are equipped with a special mechanism which is operated from one of the upper case keys to actuate a relay at the other end of the line to start and stop the machine. Otherwise the circuit to the start-stop mechanism is connected over a separate conductor and controlled by a switch.

Q. What mix should ordinarily be used in the construction of concrete manholes?

A. In this connection we have always preferred to utilize ready-mixed concrete when it may be obtained and this is ordinarily a mix of one cement, three of sand and five of rock. We have always found this to be entirely satisfactory when reinforcement rods are used properly in both walls and roof. However, some companies specify a mix of 1-3-6 for walls, 1-4-8 for floors and 1-2-4 for the roof. We doubt that this slight variation in the mix would materially effect the quality of a properly constructed concrete manhole.

Q. We have recently purchased a new paint spray and are in doubt as to whether its operator should wear some sort of protection when using it?

A. If the paint spray is used in a confined space the wearing of protection by its operator is most certainly necessary. Even though when it is used out in the open air the protection is considered best from a safety standpoint. Good respirators may now be purchased at a small cost and may be worn without discomfort. These new respirators have large filter areas which makes breathing comparatively easy as the exhaled air passes out freely through the exhalation valve located directly in the front. The location of the filter pads at the sides prevents obstruction of the wearers vision.

Q. What method of supplying battery to switchboard circuits in a common battery system is considered best practice today?

A. We would say that any of the standard methods now in use will be found equally and entirely satisfactory. After all, any arrangement in which the resistance of the common supply circuit, including that of the battery, is very low, the possibility of cross-talk will be eliminated and the results will prove entirely satisfactory. However, this must be arranged in a manner as to permit proper supervisory features in cord circuits. The repeating-coil method of battery supply is probably more generally used today than any other though the condenser impedance coil method is also used frequently and with complete satisfaction. A particular type of battery feed might give best results under certain conditions while in others a different type might prove most desirable.

Q. How should beeswax be heated for use on a switchboard installation job?

A. Various methods may be used satisfactorily though we prefer the special type electrically heated pot when commercial power is available. When this special pot is not available a common electric hot plate and ordinary cooking kettle with a cover may be used. Due to the fire hazard we do not favor the use of a plumbers furnace for the heating of beeswax in any telephone exchange.

Q. Is the two-piece transposition insulator considered suitable for use in transposing a metallic rural line?

A. This type insulator is frequently used for this purpose though it does cause considerable trouble and is not generally recommended. The single piece transposition insulator is now available and is considered much better. The drop bracket type of transposition where the regular type insulators are used is considered much better and is worth the additional cost.

Q. We have several thousand feet of small cables which are to be cleated on the walls of concrete, stone and brick buildings and would be pleased to know what type anchors should be used for this purpose?

A. Various types of anchors now on the market will prove entirely satisfactory for this work. However, personally we prefer the drive type as they hold well and may be easily and quickly installed. We know of several jobs similar to yours where this type of anchor has been used to the complete satisfaction of all concerned.

Q. What precautions should be taken when using all-metal manhole forms to keep them from sticking to the concrete and damaging the forms or the concrete in their removal.

A. This trouble seldom happens with the new type manhole form when properly used. However, the form should be removed before the concrete dries out thoroughly as this makes their removal much easier. Also it is a good plan to keep the surface of the steel forms well greased at all times. This not only makes them easier to remove but permits easier cleaning as little concrete will then stick to their surface. Oil drained from automobiles which may be purchased from filling stations at low cost and will prove entirely suited for this purpose. When the use of grease on the forms might prove undesirable slightly heated paraffin may be used with equal success. The paraffin should be applied with a brush which causes it to set when it touches the cooler metal of the form to make a hard film covering. This covering can be easily scraped off after the form is used several times which cleans it thoroughly before the new coat is applied.

Q. When we remove the lagging from new cable reels we prefer to bind them in bundles and store them until required for reuse. We have experienced considerable difficulty with these bundles coming loose, especially when they are moved frequently, when bound with wire. Is there any known method whereby this may be easily and cheaply accomplished?

A. The best method we know is to bind the bundles of lags firmly with steel strap. This steel strap may be purchased in rolls from ⅜ inch to 2-inches wide, and may be attached with a special tool. This band may be applied to a bundle of lags with much greater pressure than is possible with a wire binding, also it is stronger and holds much better. This steel strap may also be used to advantage on numerous other jobs around the telephone exchange.

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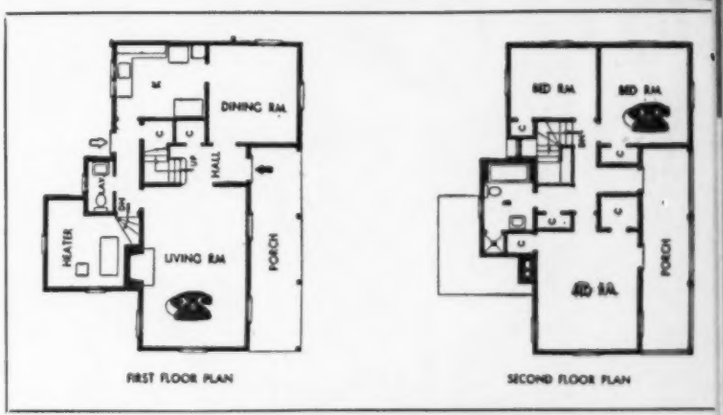

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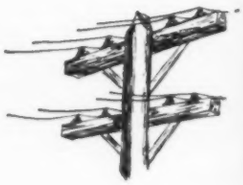

R. A. Clark, Jr.

Performance of Radio Frequencies In Emergency Service

The selection of correct radio frequencies for emergency service is essential to reliable operation. The characteristics of frequencies assigned for such service are discussed in this issue.

AS discussed in the previous issue, two groups of frequencies have been assigned by the Federal Communications Commission for emergency. The Medium Frequency assignments will be found most useful for those companies which operate in mountainous or exceedingly hilly territory, because of the characteristics of the Ultra-High Frequency assignments. However, a compromise sometimes is the best solution to a problem concerning radio transmission. Emergency communication in a public utility system generally does not require communication while a truck or car is in motion. The equipment should be portable and should be easily and quickly set up. If it conforms to these requirements, we will find our greatest success in the Medium Frequency assignments. If a truck or car is equipped with a portable transmitter and receiver operating from a storage battery, no serious inconvenience should be experienced by making it necessary for the truck to stop and erect a light aluminum pole in an appropriate socket provided for the purpose on the side of the truck when it was desired to transmit. The receiver would operate whether the truck is in motion or stationary. By making a compromise of this nature, we gain the advantages offered by the dependable ground wave radiation of the Medium Frequency waves in such of our territories as are located in mountainous country where Ultra-High Frequency radiation is of limited and uncertain performance.

The second group, or Ultra-High Frequency allocation, is composed of the following frequencies: 31420 kc, 31740 kc, 33060 kc, 33140 kc, 33820 kc, 37180 kc, 37820 kc, 39340 kc, 39660 kc, and 39860 kc. These frequencies have their advantages and disadvantages. The most serious limitation is that their radiation or ability to provide communication is limited to a line-of-sight distance between the transmitter and receiver, plus approximately ten percent. Therefore the higher up you go with one or the other antenna the further you can talk. In some cases, reflection from the sides of hills or buildings will make possible communication at points other than that dictated by the line-of-sight limitation. However, no accurate prediction of this phenomena can be made and no dependence should be placed upon it.

Figure 1 shows the distance over which the high frequency group will work under average conditions using

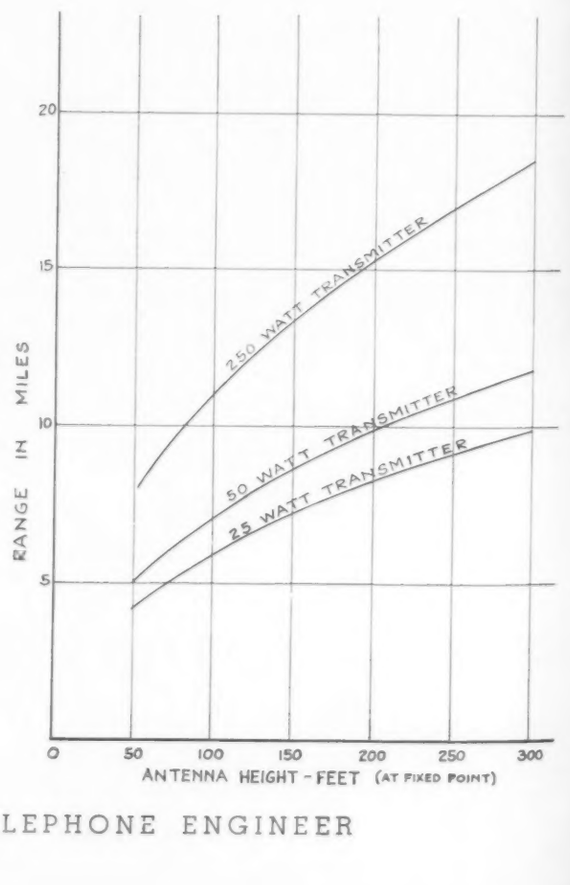

Figure 1—Range of Ultra high frequency radio transmission — fixed point to mobile unit, amplitude modulation.

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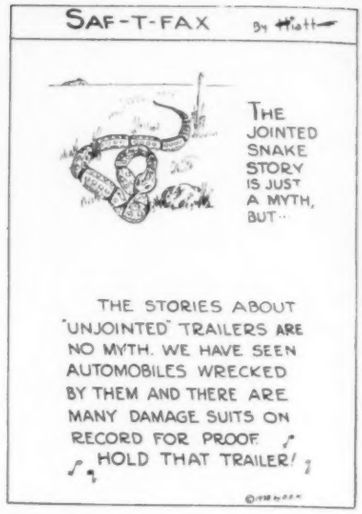
amplitude modulation. These curves are the result of experience and opinions differ somewhat as to the exact limits, however they represent conservative practice under average conditions. Some cases may require more power while others will require less. Only by actual field experience can exact requirements be determined. There is not a great deal of difference in transmission characteristics between any of the frequencies in the group, however as mentioned above, local conditions will effect to some extent the distances which can be worked with a given amount of power.

SOMEWHAT offsetting the line-of-sight limitation to the Ultra-High Frequencies is the fact that mechanically the equipment involved is small and light. It is readily portable and requires little power in order to effect satisfactory communication over the line-of-sight limitation. In addition to the mechanical advantage, the Ultra-High Frequencies are less susceptible to most electrical and natural interference, with the exception of automobile ignition. Furthermore, day and night transmission are comparable and little or no fading is involved. In effect the Ultra-High Frequency channel of communication very closely approximates a physical circuit between two points within line-of-sight distance. Those who are located in flat terrains and have available structures of reasonable height upon which to locate the Ultra-High Frequency radiator have an excellent form of mobile and point-to-point communication available which will give uniform transmission day in and day out and require little or no techincal knowledge to obtain, once the equiment is installed and placed in operation.

There are certain technical improvements which have come into use in the radio field that are of itnerest. These improvements apply equally to both the Medium Frequency and Ultra-High Frequency band. We want the operation of radio equipment to be so simple that we only have to lift the hand set, dial a number, and receive an answer. We have come to expect that of our telephones and we can obtain this simplicity in radio equipment, provided, of course, that we install our radio equipment with full knowledge of its capabilities and govern our use accordinf to the limitations of radio and the telephone circuit. For instance, if we continue to extend a telephone circuit mile after mile, we finally reach a point where transmission becomes unsatisfactory, either due to noise or low volume or both; and the same thing is true of a radio telephone circuit. The


SAF-T-FAX
By Hiatt
THE JOINTED SNAKE STORY IS JUST A MYTH, BUT...
THE STORIES ABOUT "UNJOINTED" TRAILERS ARE NO MYTH. WE HAVE SEEN AUTOMOBILES WRECKED BY THEM AND THERE ARE MANY DAMAGE SUITS ON RECORD FOR PROOF
HOLD THAT TRAILER!

radio engineers are striving to extend this limitation, and with cooperation from the utilities will be successful in a continuous expansion of the useful field of radio.

Radio equipment is rapidly approaching the same status as our ringer box on the telephone circuit. Year after year has seen a reduction of the number of dials, switches, meters and gadgets which are left to the ingenuity of the user of radio equipment to twist and turn to effect communication. Can you picture the pilot of a modern transport plane busily engaged in making adjustments of his radio receiver and transmitter prior to contacting a ground station for weather or flight instruction, and at the same time flying the ship safely on course? This is a good illustration of the tremendous advance in the design of radio equipment toward completely automatic operation. While the outside of a radio box has become less complicated, the inside of that box, from a circuit standpoint, has become increasingly complicated. This is another reason why the local radio expert is no longer in a good position to act as an authority on radio communication.

All of us are familiar with automatic volume control in radio sets, its advantages, and the improvement it effected in broadcast reception. Similar improvements have been made in suppression, limitation, and elimination of noise in radio receivers. During the time when there is no transmission over the circuit, the output of the radio receiver is automatically cut off. As a result, we do not hear any background noise, static, or man-made interference. When the circuit is put in use, the receiver is automatically turned on and the call comes through. In addition, the volume of the voice input to the radio transmitter is now regulated so that

the speaker does not have to maintain his voice at any predetermined volume as the level is automatically maintained for a constant percentage of voice in the radio transmitter regardless of the input level, within reasonable limits. The amount of background noise in a radio circuit, that is, background noise after the radio transmitter has been turned on, is being regulated so that in no case can you have a signal-to-noise ratio much over one to one, this limit being regulated automatically to follow the strength of the radio signal as it comes to the receiver. The net result of all these improvements is that when we listen to a radio dispatch circuit, such as now used by the airlines, we are hardly conscious that radio is the medium of transmission to the plane or ground station, the communication being so nearly similar to the procedure used in an ordinary telephone line conversation.

A RECENT development known as frequency modulation may materially improve the operation of the ultra high frequency bands. It is claimed that by this means of transmission the signal to noise ratio is about 30 DB better than with amplitude modulation. This is of particular advantage on portable sets where interference due to automobile ignition is prevalent. Obviously the curves of Figure 1 will not apply to frequency modulation and we may expect to work with as little as 10% of the power shown. The Federal Communication Commission has indicated its willingness to grant experimental licenses for frequency modulation in the emergency bands. This is for the purpose of determining just what can be accomplished prior to establishing a permanent policy. Judging from recent experiments it appears that frequency modulation is such an improvement over amplitude modulation in the ultra high frequency group that we may expect the majority of systems to use this scheme as soon as development work is completed.

Modern Construction Methods

(Continued from page 16)

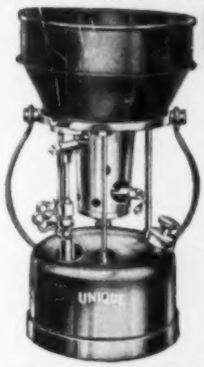
Using the nigger-head on the truck winch to make a pull.

of the pipe sections where the snatch block and hook attaches and to permit removal of the cross-timber after all pipe has been pushed into place. This method of pipe pushing has been found to be safe, rapid and accurate. Naturally, to push pipe accurately, it must be aimed correctly and a small inexpensive transit has proved most useful for this purpose.

On large underground cable jobs the backfilling of the trench represents a considerable labor cost. We have learned that an ordinary dirt slip may be satisfactorily used for this purpose by utilizing the winch of the construction truck. A rope run through a snatch-block on the rear of the truck and then given about two turns around the nigger-head is used to pull the slip through the dirt. One man handles the slip and another the rope on the nigger-head. When a load is dumped into the trench, the rope is flipped off the nigger-head or merely loosened and permitted to slide free as the slip is being pulled back for another load. Ordinarily, about twenty feet of trench may be backfilled without moving the truck. A special slip of the lightweight variety may be constructed from boards and two plow handles if desired as it will be somewhat easier to drag back by hand than is the regular all metal type. This method will prove satisfactory in some crowded streets or alleys where a tractor and a grader could not be very well used for backfilling.

THE dual tires of a heavy construction truck may also be used to advantage in tamping a newly filled trench. To utilize this method, the

A NEW, IMPROVED — UNIQUE SPLICERS FURNACE



Melts 50 Lbs. of Solder in 10 Minutes

Basically the same fine furnace used by larger Utilities for 20 years - Now with

- **FINE FLAME CONTROL**—keeps solder at "just the right temperature."
- **"QUICK CHANGE" GENERATOR**—removed and replaced in 60 seconds.
- **WIND-PROOF**—housing shields generator—No extra shield needed.

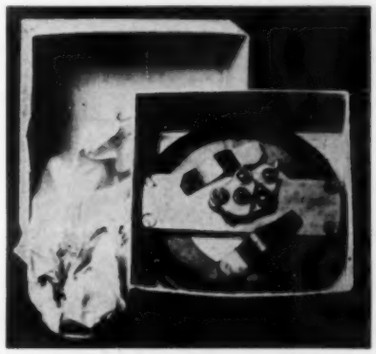
Additional Features: Long-life figure "8" generator—with orifice scraper. Rugged semi-steel top plate. Powerful pump. 16 gauge welded steel tank with bottom shock ring. Size—8" x 13". Weight—15 lbs. Popular size for 6", 7", and 8" pots.

No. 55-I—Kerosene **No. 53-I—Gasoline**

If clear white gasoline is hard to get, order the Kerosene Furnace. You'll like it.

We Invite An Approval Test

UNIQUE MANUFACTURING CO., Inc.
221 W. Walton St. — Chicago, Ill.



Keep Your Transmitters "UP"

Improved transmission standards of today demand more frequent recharging of transmitters to give your subscribers the kind of service they want. For a thoroughly dependable job, giving you accurate workmanship and highest quality carbon, use Suttle Remanufacturing service.

Price List on Transmitters

Includes refinishing of front black or nickel. Specify battery used.

10 to 49	48c each
50 to 99	46c each
100 or more	45c each

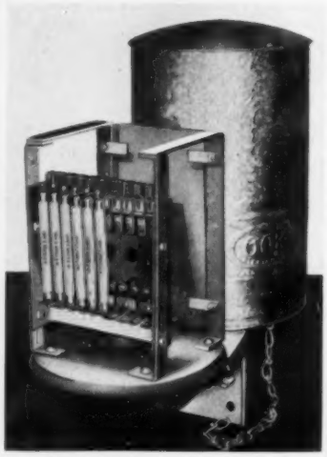
25c extra for new electrodes when supplied.

Handset Transmitters

10 to 24	50c each
25 to 49	45c each

WRITE FOR SPECIAL BULLETIN "THE TRUTH ABOUT TRANSMITTERS"

SUTTLE EQUIPMENT CO.
LAWRENCEVILLE, ILLINOIS



COMPACT

Just one of the
Many Features
of the
COOK
PROTECTED
OUTDOOR
COIL MOUNTING

You will prefer this convenient protected mounting for housing one or more repeating coils of any type. Provides protection against lightning and power circuit crosses. Equipped with A-7 Fuses and Tru-Gap Dischargers.

- Light
- Weatherproof
- Fireproof
- Terminals easily accessible.
- Reasonably Priced.

COOK
TERMINAL AND PROTECTION EQUIPMENT
COOK ELECTRIC CO.
2700 SOUTHPORT AVE. CHICAGO

trench should be filled about level, never piled high and the tires of the truck passed back and forth until the earth is well packed. The trench may then be refilled and the packing process repeated. Regular tamping machine may now be obtained which will naturally do a better job than this method; however, this may be used to good advantage when other equipment is not available.

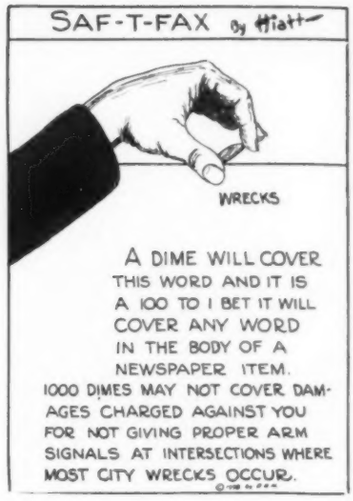
An earth boring machine will be found most useful and economical on all large toll line construction jobs. The modern earth boring machine may be used to advantage for the boring of both pole and anchor holes. These machines may be mounted on the rear of a truck or on a special catapillar tractor. The tractor is easier to maneuver in rough country and less time is required to spot the digger at the hole locatitons. It seems a pity that someone does not bring out a small portable, light weight, earth boring machine to operate by a flexible shaft from the winch of a construction truck to sell for a price low enough to place it within reach of the medium sized telephone companies.

The nigger-head is a most useful addition to any winch type truck and it may be used on numerous jobs to make life easier for linemen. The winch line may be used for all lifts or pulls and the universal type sheave makes a pull in almost any direction possible without moving the truck. However, a rope around the nigger-head is often more convenient for quick pulls than that of getting out the winch line. When the nigger head or power take-up reel is used, care should be taken to attach the end of the winch line firmly to the drum to prevent it tangling. A special holder may be obtained at a small cost which proves entirely satisfactory for this purpose.

THE power take-up reel may be used on numerous jobs to make the work easier and safer. As previously mentioned, this makes an ideal arrangement for pulling-in aerial cable, also for coiling old messenger or wire when lines are being salvaged. Ample power is available with this arrangement for dragging long sections of wire and good tight even coils are formed on the reel with very little offort. The modern power take-up reel is conveniently attached or removed from the winch shaft and is easily collapsed for removing the coil of wire. When traveling on the road this reel should always be removed from the winch shaft and carried inside the body of the truck.

While manhole pumps, air compressors and other auxiliary tools may be built in a construction truck, this arrangement is not ordinarily considered necessary except in a few special cases. While power tools may be used to advantage, we would prefer that they be separate from the truck and fully portable. When electric power is not available, it may be supplied from a portable gas engine operated generator so small that one man may carry it with comparative ease. One of these generators rated at 1800 watts, 110-volts, weighs 82 pounds and a 3000 watts size weighs 125 pounds. These small generators may be used to advantage for the operation of electric drills, hammer drills, planers, saws, etc. The gasoline operated drill may be used successfully to replace the air hammer on most telephone construction work. Manhole pumps may be either operated from a gas engine direct connected or an electric pump connected to the gas engine generator. This tool arrangement has the advantage over the built-in tool arrangement in that the tools may be used in one location while the truck is moved on to care for work at another location on the job.

The modern construction truck, especially the type with the cab mounted over the engine, has a short wheel base which makes it easily maneuvered on the job. There is no difficulty in placing the modern construction truck on the spot where it may be used to the best advantage and this may be accomplished quickly and with little effort. Modern construction trucks are rather heavy, although if adequately powered this is not a detriment and it undoubtedly contributes much to their long useful life. In our opinion, telephone companies that do considerable construction work from time to time cannot afford to be without a good construction truck, properly equipped, and we suggest that everyone concerned investigate its money saving possibilities.


SAF-T-FAX By Hiatt
WRECKS
A DIME WILL COVER THIS WORD AND IT IS A 100 TO 1 BET IT WILL COVER ANY WORD IN THE BODY OF A NEWSPAPER ITEM.
1000 DIMES MAY NOT COVER DAMAGES CHARGED AGAINST YOU FOR NOT GIVING PROPER ARM SIGNALS AT INTERSECTIONS WHERE MOST CITY WRECKS OCCUR.

"Tapping In" on Washington

(Continued from page 22)

propriations with an increase of $238,165 or a total fund of $2,076,340 for its 1941 fiscal year operations, beginning next July 1.

The Senate in considering the FCC appropriations slashed its increase by $40,000 in eliminating a proposed radio monitoring station in Alaska. The FCC had been granted by the Budget Bureau an increase of $278,165 and this amount had been approved by the House. While the bill goes to conference between the Senate and House, it was thought likely that the Senate reduction would be finally approved by Congress. The increase, however, does not provide for any expansion of telephone regulation which had been sought by the FCC in an additional $300,000 allotment before the Budget Bureau. The Budget Bureau had rejected this proposal, but it is possible that the Commission later in the session of Congress may seek a supplemental appropriation carrying these funds. Whether the FCC will obtain its projected added amount for telephone regulation in a supplemental request depends upon the future economy spirit of Congress and also if it is approved by the Budget Bureau. The present outlook in Congress is that there is little chance for the sanctioning of such an appropriation.

CONVENTION DATES

Texas Telephone Association, Plaza Hotel, San Antonio, March 19, 20 and 21.

Oklahoma Telephone Association, Mayo Hotel, Tulsa, March 27 and 28.

Kansas Telephone Association, Hotel Kansan, Topeka, April 3 and 4.

Nebraska Telephone Association, Hotel Fort Kearney, Kearney, April 9 and 10.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, April 16, 17 and 18.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 23 and 24.

United States Independent Telephone Association, Spring Conference, Stevens Hotel, Chicago, May 1 and 2.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 8 and 9.

Pennsylvania Independent Telephone Association, Yorktowne, Hotel, York, May 16 and 17.

Wisconsin State Telephone Association, Park Hotel, Madison, May 22 and 23.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, May 28 and 29.

New York State Telephone Association, Hotel Syracuse, Syracuse, June 5 and 6.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 20 and 21.

Oregon Independent Telephone Association and Washington Independent Telephone Association, Gorge Hotel, Hood River, Ore., Joint Meeting, June 28 and 29.

Minnesota Re-Elects W. S. Eckles

Starting the 1940 state Association conventions with a bang, the Minnesota Telephone Association convened at Minneapolis, January 23, 24 and 25. W. S. Eckles, Blue Earth, was re-elected president; H. F. Lueders, Norwood, re-elected as vice president, and the ever popular J. C. Crowley, Jr., Minneapolis, was re-elected as secretary treasurer. Directors whose terms expired at this meeting were re-elected.

Following the address by Mr. Eckles, the meeting heard many prominent speakers among which were representative of the Minnesota Railroad and Warehouse Commission, J. C. Crowley, Jr., F. M. Wilcox, Federal Social Security Board; Oscar Hitt, Tenney Tel. Co., Alma, Wis.; L. A. Hill, Minneapolis, representative of the U. S. Dep't. of Labor; Herman E. Hoerl, president of the Wisconsin State Telephone Association; David W. Onan, president of the Minneapolis Civic and Commerce As-

UNINTERRUPTED SERVICE

with Non-Grounding Rare Gas Arresters

Used for many years by leading Railroads for vital Telephone, Telegraph and Signal Circuits.

Type MCD (illustrated) interchangeable with your present carbon block protectors.

Write for Catalog 39-A describing
Arresters Anti-Noise Relays Terminal Strips Potheads Housings

L. S. BRACH Mfg. Corp.
55-63 Dickerson St. Newark, N. J.
Signal Circuit Engineers Since 1906

For These 7 Reasons Specify Cook No. 7 Arrester

1. Protection Against High Voltage Hazards.
2. 10 Wire Capacity.
3. Equipped with Tru-Gap Dischargers.
4. High Strength Bakelite Base.
5. Non-Corrosive Everdur Studs.
6. Heavy Galvanized Frame.
7. Solid Zinc Cover.

COOK No. 7 Lightning and High Voltage Arrester

COOK TERMINAL AND PROTECTION EQUIPMENT
COOK ELECTRIC CO., 2700 SOUTHPORT AVE., CHICAGO

sociation; C. C. Deering, Des Moines, Iowa, secretary of the U. S. Independent Telephone Association; Victor Christgau, St. Paul, of the Division of Employment and Security; C. L. Sampson, Northwestern Bell, and P. M. Ferguson, Mankato, a director of both the Minnesota and the National Associations.

The diversity of speakers and subjects presented by secretary Crowley, the entertainment and banquet and the unusual display by the manufacturers all combined to make the convention a success in every way.

WANTED—Combination wire chief and trouble man fairly experienced switchboard and outside maintenance central energy system with harmonic ringing and some cable splicing. City 5000 population Northwest. Permanent position, salary $2400 a year with vacation. Need immediately. Give education, character references, age, nationality, religion, snap shot and very complete experience. Air mail application to Box 8244.

Copperweld Steel Appoints Sidney D. Williams

Copperweld Steel Company announces the appointment of Mr. Sidney D. Williams as Vice President and in Charge of Sales for the Company's new Steel Division at Warren, Ohio.

Mr. Williams was graduated from Lehigh University in 1913 with the degree of Metallurgical Engineer. From 1913 to 1918 he worked in various departments of the Homestead Steel Works of the Carnegie Steel Company, Homestead, Pa. After serving in 1918 in the United States Naval Flying Corps, he became, respectively, Superintendent of the Open Hearth Department of the Central Iron and Steel Company, Harrisburg, Pa., Superintendent of the Open Hearth Department and Chief Metallurgist of the Pittsburgh Crucible Steel Company, Midland, Pa.

From 1926 to 1940 he has been, respectively, Metallurgical Sales Engineer, Assistant Director of Sales, Manager of Tube Sales and Director of Sales for the Timken Steel and Tube Division of the Timken Roller Bearing Company, Canton, Ohio.

W. A. Wolff Made Information Manager

W. A. Wolff

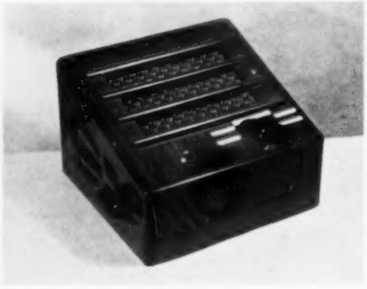
H. W. Forster

W. A. Wolff, advertising manager since 1929 of Western Electric Company and Electrical Research Products Inc., a subsidiary, has been appointed information manager of both companies effective today (January 15), it has been announced by P. L. Thomson, director of public relations. He is succeeded by H. W. Forster, information manager for the past ten years.

A graduate of Columbia University School of Engineering in 1905, Mr. Wolff became advertising manager in 1929.

Mr. Forster is a graduate of Columbia College. Since 1930 he has been information manager.

Telephone Maintainers, Salesmen, and Operating Companies —



Thousands of Two-Way Loud Speaker Systems are being sold the "hard way", that is by men who have never had telephone experience.

YOURS IS THE EASY WAY — YOU ARE FAMILIAR WITH THE TELEPHONE FIELD

Having hundreds of satisfied customers they represent a virgin field for you to exploit.
Order a demonstrator today — let one of your customers try it — then you both will be convinced of the need for such a system.

BANK'S MANUFACTURING COMPANY

5019 N. Winthrop Avenue
CHICAGO, ILL., U.S.A.

ATTENTION!

The new **DORSON STRAIGHT LINE TOLL TIMER** which we exhibited at the last Telephone Convention will be ready for the market in the near future.

Many of you saw this clock and received it with high enthusiasm.

We are now in the process of completing necessary routine to put the **STRAIGHT LINE TOLL TIMER** into production.

Your patience with us is appreciated immensely.

THE DORSON CORP.
MFG'RS. OF TIMING DEVICES FOR OVER 25 YEARS
Chicago Illinois

DROP WIRE

No. 17 TWISTED PAIR BRONZE OR COPPERWELD

Net Prices Delivered to Any Point in	New York Pennsylvania	Indiana Michigan Ohio	Illinois Kentucky North Carolina Wisconsin	Ala., Ia., Tenn., Calif., Minn., Tex. Fla., Mo., Ga., S. C.	Arkansas Kansas Nebraska Oklahoma
5000 FEET	$13.70	$13.95	$14.01	$14.19	$14.39
25000 FEET	12.90	13.15	[illegible]	13.39	13.59
100000 FEET	11.70	11.95	12.01	12.19	12.39

ACORN INSULATED WIRE COMPANY
225 King Street - Brooklyn, New York
Telephone Cumberland 6-7200

R. C. Norberg Heads Exide as President

The election of R. C. Norberg as president of the Electric Storage Battery Company, Philadelphia, has been

R. C. Norberg

announced by the company. He succeeds John R. Williams, retired, and will continue to serve as general manager to which position he was selected in 1932.

Coming to America from Sweden in 1903 after his graduation from the Royal Technical Institute in Stockholm in 1902, Mr. Norberg was employed by the Willard Storage Battery Company as an engineer and in the years following advanced steadily until he was called by Exide in 1932 and elevated to vice president and general manager.

Bethlehem Steel for Construction Body

A stock room on wheels. One of six construction trucks made by H. Kaiser & Co., Philadelphia, for a public utility company. A weight-saving of 1200 lbs., or about 32 per cent, was attained by constructing the body of Mayari R high strength, corrosion resisting steel. This steel, a product of Bethlehem Steel Company, has a minimum tensile strength of 70,000 p.s.i., a yield point of 50,000 p.s.i. min., and about six times greater resistance to atmospheric corrosion than mild carbon steel. Mayari R is readily welded by all usual electric and gas methods, and can be fabricated with ordinary shop equipment.

The truck has what is known as a "line construction body." It has a power winch which operates tripod derrick for setting poles. Every bin and sub-division are marked for the parts contained. The outside racks are for ladders.

Henry Abbott Authors Book on Calculagraph

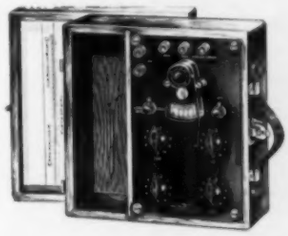
Commemorating the 45th Anniversary of the introduction of the calculagraph, Mr. Henry Abbott, the inventor and president of the Calculagraph Company, 50 Church St., New York, is now distributing his latest booklet to friends in the telephone industry.

This booklet takes the reader through the romance and history of the telephone industry almost from its infancy. It describes in detail the problems and accomplishment of the telephone art and the part the calculagraph had in the pioneering of long distance telephony.

SHALLCROSS

FAULT LOCATION CHART

Simplifies Location of Grounds and Crosses



This chart used in conjunction with the Shallcross No. 627 Cablemen's Fault Location Bridge, enables any user to make rapid location of grounds and crosses in cable and open wire. Bridge measurements are transferred to chart to obtain distance to the fault. NO MATHEMATICAL COMPUTATIONS NECESSARY.

Send for Bulletin No. 627NM

Shallcross Mfg. Co.
COLLINGDALE, PENNA.

DEPEND ON

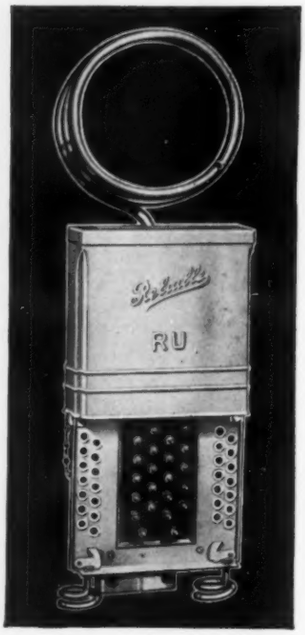
Pole Line Hardware

Trim construction . . . extra years of trouble-free service . . . you can depend on *both* when you specify L-M Pole Line Hardware and Telephone Construction Specialties. Back of every L-M hardware item and specialty you buy is the L-M record of 30 years of dependable service to America's great electrical utilities. Place your order for L-M hardware with our national distributor, the American Automatic Electric Sales Company.

LINE MATERIAL CO.
REPRESENTED BY
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

A DEPENDABLE

CABLE TERMINAL



Reliable

Type RU unprotected terminals are easy to install, easy to work on and built to outlast the cable.

Upon request we will send a sample for your inspection without charge.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE - CHICAGO, ILLINOIS

QUESTIONS & ANSWERS

Address questions to MR. ATWELL JACKSON

Question—What suggestions can you make in the way of sales stimulants; (a) to the active and potential subscriber, (b) to the employee who brings in new subscribers?

Answer—You have often heard that there is nothing new under the sun; and while I do not advocate the "copy-cat" method, I can find nothing wrong with borrowing an idea from another industry, or another type of business that is getting results.

For instance Independent Telephone Companies will find many valued ideas in other forms of promotion. That is, if I understand your question to be one of a premium nature—which I think it is. In premiums, usually it is wise to offer a premium or some sort of inducement that is relative to the product which is for sale.

I do not know of a better sales stimulant to offer to a new subscriber than an accident insurance policy, which is at present very popular among big city newspapers to increase circulation. Frankly I have not looked up the details of this connection. Your local insurance man, however, should be in a very good position to co-operate with you. But what I do know about the issue is that an accident insurance policy offered to a new subscriber, or the renewal of an old subscriber will have a double barrel effect. First it is something in addition. Secondly it is of value to your subscribers, especially so to the rural user, who usually does not have, and frequently does not even know about the virtues of an accident policy.

In the larger cities like Chicago these policies are given with a subscription to the local newspapers, BUT NOT TOTALLY FREE. The subscriber must pay part of the cost. And it is a known fact that many holders of these policies have been paid as much as $7500 from accidents which the policies covered.

This insurance factor is but one phase of the possibilities. Look over your big city newspapers, especially the Sunday Editions and you will find many ideas that are used by other types of business that can be applied to your own.

However, either in the department of subscriber stimulants or employee stimulants always do a promotional job of this nature with a definite purpose in mind. To give a premium, merely to give a premium, cannot get very far. And the same is true with a contest to get new subscribers by which you offer some sort of stimulus to your employees. It must have a definite purpose and must be built along definite constructive lines.

Personally, I do not know of a better method of stimulating selling on the part of your employees than a sales contest. This is in answer to your question "B". But as mentioned above, have the contest for a specific purpose. For instance make a definite resolution to add a certain number of new subscribers and by using that as your goal, build the contest with a pyramiding effect toward that end in view. Contests should be peppy, full of human interest and be one that caters to the employees who participate. It should be of a nature that adds to the friendly spirit of competition among the employees and where prizes are given the prize value should be attractive.

No matter how large or how small your business a sales contest will always work swell if it is planned correctly. My suggestion for planning a contest would be, (1) determine just what you expect as a result of the contest, (2) build your quotas and prizes to attain that end, (3) make the contest of a sporting nature, (4) start the contest with all who participate under a handicap that will add employee interest in overcoming these obstacles, (5) make the contest itself reasonably simple and a strong inducement for all to add extra effort to go over the top.

Death takes G.A. Scoville, Stromberg-Carlson Vice President and General Manager

Succumbs After Long Illness

George A. Scoville, 63, vice-president and general manager of the Stromberg-Carlson Telephone Manufacturing Company, died January 14, 1940 in General Hospital at Rochester, N. Y.

He was taken ill early in September while on a business trip in Seattle, Wash., but recovered sufficiently three months later to return to his home in Rochester. Early in January his condition became worse, and he was taken to the hospital.

The record of Mr. Scoville's business activities is filled with a wealth of both engineering and sales experience. He was born in Ironton, Mo., but completed his secondary education in Corona High School, Corona, Calif., then attended Stanford University for two years, studying electrical engineering.

His next three years spent in the shops of the Western Electric Company in Chicago, after which he returned to Stanford. He was graduated in 1903.

Following a year with the Southern California Edison Company he returned to the Western Electric Company. In 1905 several former associates, then with the Kellogg Switchboard & Supply Company, Elyria, Ohio went to the Dean Electric Company in that city, and Mr. Scoville left the Western Electric Company to join them. Two of those men, Ray H. Manson and Sidney A. Beyland, eventually went to Stromberg-Carlson with him.

With the Dean Company Mr. Scoville held positions of sales engineer, Pacific Coast manager and sales manager until 1916, when he came to Rochester as sales manager for Stromberg-Carlson. While with the Dean Company he spent a year in Australia and New Zealand.

In 1920 he was made a director of the Stromberg-Carlson Company, and in 1924 he was named vice-president.

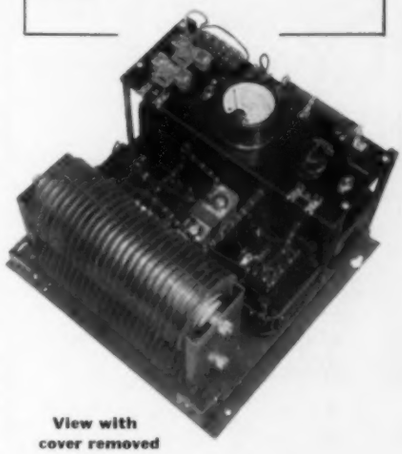
He was a director of the United States Independent Telephone Association and chairman of the Telephone Manufacturers Section, as well as chairman of the Supervisory Agency of the Telephone Manufacturers, the group administering the code for the industry, and a member of the board of the Radio Manufacturers' Association. He was known not only in the telephone industry, but was personally acquainted with radio dealers throughout the country, having been connected with the radio business since 1922, when Stromberg-Carlson went into that field.

He was a member of the Genesee Valley Club, the Rochester Club, Oak Hill Country Club, the Rochester Chamber of Commerce and the Stanford Club of New York, and held membership in the American Institute of Electrical Engineers and the Rocheseter Engineering Society.

He leaves besides his wife, three brothers and two sisters, all of California, Charles H. Scoville, Corona; Harry F. Scoville, Monrovia; Gilbert L. Scoville, San Gabriel; Mrs. Earl Thayer, San Diego, and Mrs. Frederick W. Kaster, Corona. Mrs. Scoville is the former Mary Dyer, a native of California.

Precision Clock for Public

An electric precision clock was installed during November in a front window of the A. T. & T. Co. building at 195 Broadway. Designed by research physicists of the Bell Telephone Laboratories, it has been built for the most part in the laboratories' own workshops. The few parts built elsewhere



View with cover removed

DC Voltage stays on the line *automatically* when you use a Raytheon RectiChargeR.

Its constant voltage output eliminates such operating headaches as incorrect ringing, sticking relays, frying transmitters and short lamp life, when these troubles result from overvoltage caused by overcharging.

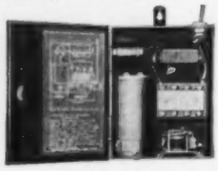
A RectiChargeR with a small storage battery floating across its terminals makes a complete, automatic AC-DC constant voltage telephone power unit. Dry disc copper-oxide rectifying units are used with other components that are equally long lived and free from maintenance.

RAYTHEON MANUFACTURING CO.
134 WILLOW STREET, WALTHAM, MASS.

The Clearing House

For the convenience of readers of Telephone Engineer

THE NEW ELECTROX
Battery Eliminator Type PA-05004



$16.85

Complete with power-off relay. Output for two operators' sets. Mount; connect two leads to operator's terminal; plug in cord. Presto! no more battery problem! Sent on trial. Write for Cir. 373.

ELECTROX 2060-68 Reading Road
A Schauer Product CINCINNATI, OHIO

DIRECTORY BINDERS

for the office or home telephone. Protects your book and improves the appearance 100%.

Substantially made, equipped with plated metal fixtures. Available in single copy or in multiple style.

ARNOLD COMPANY
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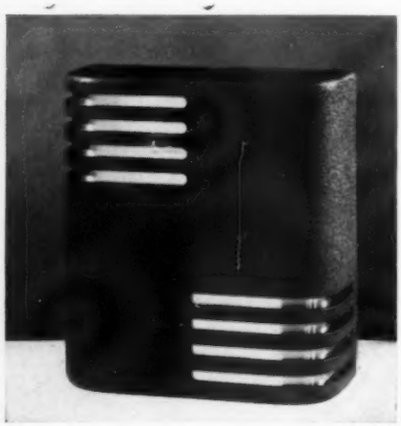
TELEPHONE DIRECTORY
LOOMIS ADVERTISING CO.
TELEPHONE DIRECTORY ADVERTISING
A SALES ORGANIZATION
Exclusively....
That Has Never Failed to Produce More Net Revenue for Telephone Companies Served, All Costs Considered.
IF INTERESTED in more net telephone directory revenue write or call at our expense.
LOOMIS ADVERTISING CO.
Telephone Bldg., Kansas City, Mo.
Citizens Trust Bldg., Ft. Wayne, Ind.
135 So. Second St., Philadelphia, Pa.

have been constructed to the specifications and under the supervision of the designers. It will be synchonized with the New York Telephone Co.'s time bureau and will be accurate within a few hundreths of a second.

Most conspicuous feature of the clock is the thirty-six-inch illuminated glass dial, marked in seconds, near its outer edge. The long sweep second hand is an indication of the clock's extreme accuracy. Hour and minute hands are shorter, and have their markings nearer the center of the dial. Behind the dial is a case containing the ingenious driving mechanism; dial and case are supported between floor and ceiling of the display window by pipe through which run connections to a control panel in another part of the building.

Stromberg-Carlson Introduces Chime Bell Box

Stromberg-Carlson has just introduced a bell box employing rich chimes inistead of the standard gong—an extra refinement for homes, clubs, apartments, and offices. It is designed for single party straight line ringing only on either 33 or 16-20 cycles. This new



bell box has a black crackle finish with louvres at the upper left and lower right corners to permit the sound free circulation. Behind these louvres are countersunk, dull silver colored metal guards which add greatly to the beauty of the unit. The chimes are located across the top and bottom of the box with the armature that controls the movement of the chime clapper in the

Payout Reels

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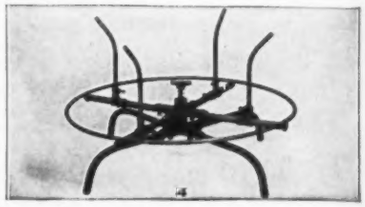

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